

## East Waterway OU

### Anthropogenic Background Meeting #5 Meeting Notes

Participants: EPA, East Waterway Group (Port of Seattle, City of Seattle, and King County), Muckleshoot Tribe, Suquamish Tribe

**October 21, 11 am - 1 pm**

Meeting	Purpose	Materials (Prepared by EWG)	Outcome
#5 Data sufficiency evaluation	Week 7, October 21, 11 am - 1 pm	Determine if there are any critical data gaps required to determine AB.	Determine if any critical data gaps exist and the extent those data gaps influence uncertainty in AB.

### Meeting Materials

Table 1. East Waterway Anthropogenic Background Estimation: Green River Suspended Solids and Whole Water Data Sufficiency (pdf)

Anthropogenic Background Meeting #5 presentation (pdf)

### Attendees

#### EPA

- Kira Lynch
- Elizabeth Allen
- Erika Hoffman
- Sean Sheldrake
- Shawn Blocker
- Elly Hale
- Silvina Fonseca
- Karl Wilson

#### USACE (on behalf of EPA)

- Bill Gardiner
- Kayla Patten

#### Suquamish

- Alison O' Sullivan
- Denise Taylor

#### Muckleshoot

- Glen St. Amant

#### East Waterway Group (EWG)

- Brick Spangler (Port of Seattle)
- Joanna Florer (Port of Seattle)
- Kathy Bahnick (Port of Seattle)
- Jeff Stern (King County)
- Debra Williston (King County)
- Pete Rude (City of Seattle)
- Allison Crowley (City of Seattle)
- Merv Coover (ERM on behalf of the City)
- Dan Berlin (Anchor QEA on behalf of EWG)
- Greg Brunkhorst (Anchor QEA on behalf of EWG)

## Meeting Notes

**Dan Berlin:** [Roll call]

This is Meeting #5, although it is the fourth meeting in the series. Previously, we discussed the East Waterway conceptual site model in Meeting #1, the Green River data in Meeting #3, urban inputs, primarily influenced by lateral inputs, in Meeting #4, and today we are discussing data sufficiency.

[Slide 2] The agenda for today is to discuss the data sufficiency framework as it pertains to suspended solids and whole water data. We will discuss the data sufficiency framework. Table 1 was distributed on Monday, which has the data sufficiency framework applied to the suspended solids and whole water data. The framework includes evaluating the datasets for acceptability, representativeness, and adequacy. Then we will look at some data explorations, and at the end of the meeting, hopefully determine whether or not there is sufficient data to move forward with the AB evaluation.

Please pull up Table 1 from Monday's email to follow along.

[Slide 3] From the meeting series planning document, the purpose of the meeting is to determine if any critical data gaps exist and the extent those data gaps influence uncertainty in AB. Anything else to add, Kira, or does this look good?

**Kira Lynch:** sounds good

**Dan:** [Slide 5] This similar to the figures that you have seen previously, showing the sources of sediment to the EW and datasets associated with each source. Based on what we heard from EPA last meeting, we have retained suspended solids and whole water data for compilation, which is shown in red. The suspended solids data were provided to EPA in a compiled database this past Saturday, and we are still working on assembling the whole water data for EPA.

Blue font are the data sets we have not compiled. We have not assembled the bedded sediment data. We have only provided suspended sediment and whole water. We have not assembled the LDW bed sediment or the LDW or EW laterals. Last meeting, we talked about the challenges in using those data considering remediation has not been completed in the LDW and source control has not been fully completed for laterals.

**Debra Williston:** I'm noticing on the slide that there are also LDWG whole water data that have been compiled that were not listed on the slide.

**Dan:** Right. That's not listed here, but that data was evaluated and is included in Table 1.

**Dan:** [Slide 6] Slide 6 shows the datasets that have been retained for the purpose of this meeting. We have retained Green River suspended solids data and the Green River whole water data. Green River and Turning Basin bedded sediment have not been included and have been screened out of potential inclusion for AB. LDW bedded sediment and laterals have not been compiled nor provided to EPA and are screened out for this sufficiency analysis. EWG would like to use these datasets as part of a sensitivity analysis once we are closer to having AB established to understand how much they could affect an AB number.

[Slide 7] Slide 7 shows the data sufficiency evaluation framework for this evaluation, which we developed based on EPA's Frequently Asked Questions document on developing background concentrations at superfund sites. Acceptability includes whether the sampling and analytical methods were of acceptable quality to estimate AB. Representativeness is whether the data are representative of solids entering the EW. And adequacy is about the sample counts needed to calculate a defensible AB.

[Slide 9] For acceptability, the studies listed in Table 1 are all well documented and have publicly available data. For field sampling, we list the sampling methods and field QA/QC, replicates, blanks, etc. For analytical acceptability, we list the laboratory methods and detection limits. Aroclor samples had higher detection limits, we will discuss later. We also list data validation for the studies.

[Slide 10] We didn't draw conclusions in Table 1, but we do feel like the data are acceptable.

[Slide 11] For potential acceptability concerns, some PCB Aroclors had high detection limits, and for those samples we would suggest Aroclors are not included if congeners were also analyzed. Whole water Aroclor data were all non-detect and are of limited use. Also, using whole water data to estimate a solids concentration requires TSS-normalization of whole water samples, which introduces bias.

**Ericka Hoffman:** Could you provide additional detail on water sampling and the TSS-normalization?

**Debra:** for sampling, most of these data are composites of multiple grab samples. They would typically fill a carboy from the grabs to form a sample and take splits from the sample for each analytical method, although sometimes single grabs and multiple bottles are used for sampling. After sampling, the concentration data are divided by total suspended solids to obtain a TSS-normalized value.

**Ericka:** how is TSS measured?

**Debra:** in the laboratory; filtering sample through 1  $\mu\text{m}$  filter, following standard method.

**Ericka:** so straight TSS normalization biases the data high?

**Debra:** generally, yes, because whole water includes freely dissolved, particulate and colloidal fractions although arsenic is whole water minus dissolved and then divided by TSS. Also using partition coefficients and TOC and DOC could be explored.

**Ericka:** so it is fair to say that the data are biased high?

**Debra:** yes, that is the assumption.

**Dan:** Any other questions?

[Slide 13] Representativeness considers the geographical location of sampling, which took place upstream of the EW and LDW superfund sites at RMs 6 to 12.

Temporal considerations include the recency of data, many of which are quite recent. Timeframe has to do with the sampling time frame, which can be 24 to 48 hours for centrifuged solids and around three months for sediment traps. Temporal also includes whether all flow conditions were sampled within each study, which have been previously defined as significant dam release, storm event, baseline flow, and storm plus significant dam release, as discussed in previous meetings.

Physical considerations include whether the samples are composed of fine-grained sediment, which is what moves down the Green River and through the Lower Duwamish into the EW.

Land use considerations are whether the land use types represented by the sample are similar to the EW.

[Slide 14] If we were to draw conclusions, we think the data are representative of solids entering the EW. They are upstream of the EW, there is representation of all flow regimes, suspended solids are largely fine grained, and land use similar but less urban than the EW.

If we had any potential representativeness concerns, they would include that when only using Green River data, urban inputs to the EW are not fully captured. As discussed before, the process of TSS-

normalizing whole water samples introduces bias. Also, some sediment traps have low percent fines as they are close to the bottom and have a larger sand fraction that is likely to settle out and not move to the EW.

Any questions?

[Slide 16] Adequacy is the amount of data. The sample counts are shown for the different categories. This represents the data with some initial screening as presented on slide 11 (with most Aroclors screened out). We have a good distribution of flow categories.

**Debra:** for whole water samples, 12 detected for PCBs appears to be a mistake

**Greg:** yes, that should be 102 rather than 12, it is a typo.

**Debra:** note that for dioxins/furans in water, sometimes only a few congeners were detected, and for TEQ the non-detects can be included so you would want to look at congener data and use caution with the TSS normalized based on TEQ.

**Elizabeth Allen:** TEQ is not helpful for determining background, we would want to look at total dioxin/furan congeners.

**Greg:** [Slide 18] For data explorations, we took an initial look at the data. We looked at the distributions using Q/Q plots. We also looked at what the data looks like for different sampling methods, flow event types, and TSS-normalized whole water. Aroclors are not included in these charts for simplicity.

[Slide 19] For the Q/Q plots, the y axis is concentration, but the middle plot is log concentration. If following a certain distribution, points would fall along the diagonal line. We are showing normal, lognormal, and gamma distributions in this slide. If a point is above and to the left of line, the concentration of that sample is higher than you'd expect for that distribution type. If a point is below and to right, it would be less than you'd expect for that distribution type. The distributions will be useful for calculating UCLs down the road, but we are not there yet. Data for PCBs best follows a lognormal distribution, which is typical of environmental data.

[Slide 20] Dioxin/furan data show a similar pattern to PCBs, and fits a lognormal distribution best.

[Slide 21] Arsenic follows a lognormal distribution but could also follow a normal distribution.

[Slide 22] These box and whisker plots show suspended solids concentrations for each sample method, including centrifuged solids, filtered solids, and baffle and jar. Centrifuge and filtered solids represents a 24 to 48 hour sample. The baffle and jar are sediment traps deployed for 3 months, representing a time weighted average.

This chart can help us see whether the different types are lining up with respect to different periods being sampled. Centrifuge and filter solids are lining up pretty well. Time weighted average of the baffle and jar sediment traps show lower concentrations. High concentrations are from centrifuge and filter solids. Storm events during periods without significant dam release influence concentrations in the river system.

For box and whisker plots, 50% of the data fall within the box. Whiskers show 1.5 times the inter quartile. Dots shown are each sample, so can visually get a sense of the concentrations.

**Debra:** Baffle and jar samples have a few with lower % fines (18% and 25% fines), so additional screening may be required down the road.

**Greg:** baffle and jar can accumulate coarse grained material including sands. But centrifuge and filter solids don't accumulate many sands.

**Sean:** Do you have fines size fractions using micron size for fines that get into the EW?

**Greg:** No haven't teed up size fractions for today's presentation

**Jeff:** We don't have any direct measurements to pull that info out clearly. We would need to look at the model results to determine that. The material leaving the LDW that splits between the EW and WW is 98% of class 1a and 1b in the model, which is finer than 60  $\mu\text{m}$ . It's mostly fine material. The rest of the material is class 2. Nothing in class 3 moves into the EW, which is fine to coarse sand. So fine to medium sands don't move into the EW at all.

**Sean:** that makes sense, we may want to parse out biases in the baffle and jar samples considering bedload and consider how much that data is time weighted. There are pros and cons for going after a specific size fraction.

**Jeff:** if we determine we have sufficient data to establish AB, we will pull all size data out to take a better look at that.

**Sean:** that makes sense

**Greg:** On the next slide, you'll see that centrifuge and filter solids will be combined to look at flow types. The baffle and jar will be combined together as sediment traps.

[Slide 23] Centrifuge and filter are in the 1st 3 columns for baseflow, significant dam release, and storm event. The influence of a significant dam release masks the influence of a storm event. The 4th column is the solids data with jar and baffle combined over a longer time period.

For all 3 contaminants, baseflow is in the middle of the other datasets, fairly consistently. For PCBs, the significant dam release has lower concentrations. Storm events have a much wider range of what

is coming into the system, which can result in higher concentrations of particulates moving in. The sediment trap is consistent with a time weighted average. Dioxin/furan shows a similar pattern as for PCBs. Arsenic baseflow is more similar to the storm event and sometimes jumps up. Arsenic does drop in concentration during significant dam release. The storm data shows a little bit of a different pattern compared to baseflow when comparing the same for PCBs and dioxin/furans. For the sediment traps for arsenic, these lower concentrations may result from getting higher sand fractions in the sediment traps.

[Slide 24] This is new information. All preceding data is included in one column for suspended solids. Whole water concentrations divided by TSS is shown for PCBs and dioxin/furans, which assumes that all contamination is bound to particulates. For arsenic, we take the total unfiltered water concentration and subtract out the dissolved fraction and then divide by TSS<sup>1</sup>. In theory, this reduces bias by removing the dissolved fraction, but it is factoring more uncertainty from 3 lab measurements into that calculation.

In general, PCB distributions are pretty similar. For dioxin/furan, distributions don't line up well, potentially due to low concentrations of dioxin/furan and difficulty of measuring that low of a concentration in water. For arsenic, there is more scatter in whole water, but maybe this is from more lab variability in three measurements multiplied together to back calculate to a solids concentration. Overall, it is kind of a mixed bag comparing whole water data to suspended solids data.

**Erika:** in LDW, when they updated the model inputs, did they consider whole water TSS normalized data?

**Debra:** no we didn't use it in the updates to the Bed Composition Model (BCM) because we had suspended solids data, which we didn't have in the LDW Feasibility Study. So we used suspended solids as a line of evidence instead.

**Erika:** Was there a consideration for using whole water that would be applicable here too?

**Debra:** There is inherent bias when you TSS normalize and in the LDW, we were not wanting to take the time to look at those biases and what it could mean. So we just chose to use the suspended solids data since we had it.

**Erika:** ok thanks

**Debra:** We mentioned today that water is a supplemental line of evidence. It's worth considering it from a supplemental perspective to see if there is any use to it.

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<sup>1</sup> As a follow up to the meeting, King County collects dissolved samples for metals by filtering a second water sample through a 0.45 um filter and then analyzing the filtrate.

**Greg:** the water data does seem to be more for informational purposes and to see if this data is useful. It seems to be that given the amount of suspended solids data that we have, that will be the main source of info for AB determination.

**Erika:** Seemed like the water was getting more attention that I would expect

**Greg:** seems like we're on the same page about the value of the water data

**Dan:** [Slide 26] For the sufficiency determination, EWG believes that the Green River data are sufficient for AB estimation. If there was a data gap, it would be that only using the Green River data for AB would not include direct urban inputs, but we don't feel this is a critical data gap for AB determination.

[Slide 27] is EPA in agreement?

**Kira:** We are in agreement the data are sufficient. As far as next steps, we feel it would be more productive to have a smaller group of people working with the data to work through the actual data analysis. It would be more efficient and effective. We are thinking it would be 3 people from EPA and we could give you a list. We came to the same conclusion to focus on the suspended solids data due to inherent bias of the whole water data. Water data could be a supplemental line of evidence.

**Elizabeth:** suspended solids data would be the most useful. We really appreciate that you did graphical representations. It does show some puzzles, but starting with a dataset of around 60 results, that is sufficient for our purposes. I think we will get a defensible number out of it.

**Brick:** I have a question on the smaller group. Do we envision the smaller group reporting back on the larger group on results?

**Kira:** yes

**Brick:** It's hard to believe that a smaller group meeting on Nov 4 would be beneficial. I want to keep momentum, but also don't want to put an unrealistic expectation on the smaller group.

**Pete:** Would we use the November 4 date to report back to the larger group?

**Brick:** I think the November 4 meeting may be aspirational.

**Debra:** yes it's aspirational, but a smaller group meeting would work on that date.

**Brick:** Would we envision putting together a similar but scaled down agenda for that group to outline the process for development of AB?

**Kira:** Maybe we can move backwards. Ideally we'd like to get a technical memo that at least has been through this entire group and have numbers pretty well established by January. So moving



backwards from that, I was hoping the smaller group could figure out the best way to go through the next steps to have a report out to the larger group. It would be nice to not have them wait until Nov 4. Hopefully we can get through that process and have reported out to the group by the end of November.

**Allison:** 1 point of clarification. When you say January, do you mean January 1 or January 30 or somewhere in between?

**Kira:** somewhere in between. I recognize it's a hard time of year.

**Silvina:** Is the technical memo in January that the group is recommending for coordination with state and tribes or for this group?

**Kira:** We will have somebody in the tribes involved in this, but we will need to reach out to the state so they are involved. That target date is to already have completed coordination with all those groups. Having a report out to this larger group in the November timeframe would give time in the early weeks in December to do additional coordination that we'd need.

**Elizabeth:** That timeframe sounds overly ambitious, particularly having something done in November.

**Kira:** that's valid. Instead of making snap decisions on this, let's look at this a little closer.

**Silvina:** Let's have a proposal to consider by the end of November, but we may not be able to do it until December. The concern is whether we will have enough data to communicate to management. And we have to be realistic with what it will take to go through the process.

**Allison:** Suquamish won't be able to review anything the last 2 weeks of December, as our offices are closed.

**Elizabeth:** Speaking for me and others at EPA, we are only allowed to carry so much leave at end of the year.

**Debra:** even with Covid, folks will still be taking time off, so realistic schedules are appreciated.

**Brick:** I'm hearing that from EWG and from Kira that there is sufficient data to develop a number. We're working on how best to develop that number. As we are working toward that and documenting the process, hopefully we make good progress in November and early December and Kira can report up to HQ in lieu of having a draft report that has been vetted by all parties.

**Silvina:** The crucial question was whether we have enough information. From my management perspective, we can move forward to the next piece. Maybe the smaller group could get together to figure out the timeline and how much work is needed to feel comfortable to propose a number.

**Alison:** did I hear correctly that the EPA report would go to HQ before the stakeholders have had a chance to review, because we have problem with that.

**Brick:** I thought the report out to HQ would report on the progress rather than a developed number. We recognize it will be difficult at the end of the year, and a schedule hasn't been developed yet.

**Kira:** I was charged by the regional administrator to report back out to him on the primary question that was "should we continue to move forward on an interim ROD approach or should we go with a final ROD approach"? And key factor of which path to take was whether we felt there was sufficient available information to move forward to calculate AB concentrations. That's the point Silvina was trying to make, that we would report to our management on the path we're taking for a ROD, and I want to be clear on that, is that yes we feel that there is sufficient info available to start the process to calculate AB. And, as a result of that, we will develop an updated schedule to do that calculation, document it for the administrative record, and move forward with a final ROD.

**Elizabeth:** after additional discussion amongst us, maybe everybody will have the same idea about how to aggregate it and do calculations, but that may be overly optimistic. I think everyone will be more prepared about how to discuss schedule later.

**Kira:** The concept I was throwing out is that we would split off a smaller group to work through detailed data analysis, and that group would report to this larger group. So that would happen before we take any analysis up to management. I have 2 questions: 1) do people agree that's a more efficient way to do this?, and 2) who would like to be part of that group? From EPA, we had talked about Elizabeth and someone from Corps, and Ravi.

**Debra:** Is the idea a smaller group would go away and would work on the technical approach and before calculating numbers, would come back to larger group with approach?

**Kira:** the small group would go through the rationale and develop calculations and present approach and numbers back to the larger group

**Debra:** so that would be before anything is written up, so go to larger group with a presentation format?

**Kira:** Yes

**Debra:** Sounds good

**Silvina:** For the November 4 meeting. What is the topic?

**Brick:** We probably won't have enough technical information by then.

**Jeff:** no we won't

**Brick:** I want to circle back to Alison to make sure that her question was answered to her satisfaction and whether tribes would want to be part of smaller technical group.

**Alison:** I can't guarantee we will have availability but the opportunity to participate would be nice.

**Brick:** did Kira clear that up about not reporting to HQ before going to larger group?

**Alison:** I understand and have questions on the schedule. I still have outstanding concerns with the holidays and we also have use it or lose it vacation time. So, I want to make sure the tribes have adequate opportunity to review and provide comment and input.

**Brick:** I don't think any of us want to envision not having adequate time to review.

**Alison:** I always get a bit concerned with deliverables available in mid November and December as the tribe will need adequate time to look at it.

**Brick:** maybe one of the first items for this smaller group is a realistic schedule that can be communicated to the larger group so we can plan accordingly.

**Kira:** that's what I think. It would be better if we have something worked out that we can provide and people can buy into and will be doable. Once again, Elizabeth was saying we need to give the smaller group time to move through this and figure out when to bring in the bigger group.

**Elizabeth:** I believe we have determined that we have achieved the goal of determining we have sufficient data available and can report that to HQ immediately. I get the impression EWG is pleased and we're pleased there is enough data. I don't see a need for large group meeting on November 4 but I would like to keep the momentum going.

**Silvina:** The first question from HQ will be 'when can you have that number'? So if there is a way for us to relatively soon come up with those steps, that will be their first question. So it would be helpful to see what steps the small group will take.

**Jeff:** My concern is that the time will be used in understanding the right subset of data to use. The analysis is not quite as time consuming. Until we get to that point, it's hard to develop a schedule. I'd suggest not overpromising.

**Silvina:** I want to be aggressive on the schedule but also realistic. I want to make sure we have input from all interested parties, which will be helpful to communicate back to management, and what steps will be needed. You have done a tremendous amount of work and we appreciate that, but we are going to get some pressure to get this done as soon as possible.

**Debra:** We all agree we want to keep this moving.

**Brick:** I assume we will get a list from EPA on the individuals in the small group this week from Kira or Ravi? Also that we would loop in the tribes in the small group if they are available to participate.

**Debra:** Can we schedule a meeting in December and January as placeholders for larger group?

**Brick:** Will plan to send out an early December placeholder

**Debra:** would recommend we send out an early January date as placeholder too

**Kira:** agree

**Jeff:** we can work up a schedule for the small group meetings. Assuming the 4th and the 18th are already on calendars, we can use those and supplement with other meetings.

**Debra:** The 18th overlaps with LDW stakeholder meeting

**Brick:** anything else for path forward?

**Kira:** not from us. Thank you for going through this whole process. We know you did a lot of work.

**Brick:** huge kudos to Greg and Debra.

**Debra:** should Greg continue to pull together the water database as supplemental info?

**Elizabeth:** when I looked at the data, it seemed like we have sufficient suspended solids data to work with, even if not all of it gets used. There is enough data there to probably come up with something. Unless you feel the supplemental info in the water data outweighs the amount of work to assemble the water data.

**Debra:** Greg, what do you think?

**Greg:** we have a pretty clean dataset and plenty of work went into it. We can tie a bow on what we have which is not a lot of extra work. I expect it not to be used. I can spend a few hours to get it over the hump in case it is needed rather than a month from now we're curious about something and it would be more of a struggle down the road to get that information. So that will be my path forward. It won't be a lot of extra time beyond what has already been spent.

**Brick:** Dan any other items?

**Dan:** EWG looks forward to meeting with the small group and getting those meetings scheduled. We will start to send out a doodle to get those meetings scheduled. Kira, can you let us know who from USACE and who else besides Ravi and Elizabeth should be included in the small group?

**Kira:** yes, I'll get together with Ravi and send you the list of people by Friday

**Dan:** great thanks everyone